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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/033,743	12/28/2001	K.S. Narayan	2003624-0001	8961
24280	7590	01/04/2005	EXAMINER	
Choate, Hall & Stewart Exchange Place 53 State Street Boston, MA 02109			QUINTO, KEVIN V	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/033,743

Applicant(s)

NARAYAN, K.S.

Examiner

Kevin Quinto

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-23 and 28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23 is/are allowed.
- 6) ☒ Claim(s) 17-19, 21, 22 and 28 is/are rejected.
- 7) ☒ Claim(s) 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>15 October 2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 17-22 and 28 have been considered but are moot in view of the new ground(s) of rejection.
2. The examiner notes the changes made to claims 18 and 19 and therefore hereby withdraws the rejection of claims 18 and 19 under 35 U.S.C. 112.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 17, 19, 21, 22, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dodabalapur et al. (USPN 5,596,208) in view of Bao et al., ("Soluble processable regioregular poly(3-hexylthiophene) for thin film field-effect transistor applications with high mobility," Applied Physics Letters 69 (26), p.4108-4110, 1996).
5. In reference to claims 17, 21, 22, and 28, Dodabalapur et al. (USPN 5,596,208, hereinafter referred to as the "Dodabalapur" reference) discloses a similar device. Figures 2 and 6 of Dodabalapur each disclose a field effect transistor with a semi-transparent gate electrode (14). There is an electrically insulating layer (15) with a first side and a second side on the gate electrode (14). The first side is adjacent to the gate

electrode (14). A semiconducting polymer layer (16) is formed on the second side of the gate electrode (14). Dodabalapur discloses that the semiconducting polymer layer (16) can be poly (3-octylthiophene) as well as poly (3-hexylthiophene) but does not disclose the use of a polymer layer which is regioregular polyalkylthiophene with 98.5% head-to-tail regiospecific conformation. However the use of such a material in field effect transistors is well known in the art. Bao et al., ("Soluble processable regioregular poly(3-hexylthiophene) for thin film field-effect transistor applications with high mobility," Applied Physics Letters 69 (26), p.4108-4110, 1996, hereinafter referred to as the "Bao" reference) discloses that a polymer layer made of a regioregular polyalkylthiophene with 98.5% head-to-tail regiospecific conformation has the advantages of better ordering (p.4108, right column). Bao discloses that good ordering leads to high transistor performance (p.4108, left column). In view of Bao, it would therefore be obvious to use a polymer layer which is a regioregular polyalkylthiophene with 98.5% head-to-tail regiospecific conformation in the device of Dodabalapur in order to obtain the benefit of high transistor performance. The manufacturing process used to produce the device of figure 2 meets the fabrication method of described in claims 17, 21, and 22. As for the claimed use (the term "photosensing organic field effect transistor" and claim 28), a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the

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prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Therefore claims 17, 21, 22, and 28 are not patentably distinguishable over the Dodabalapur reference.

6. With regard to claim 19, Dodabalapur discloses the use of a silicon dioxide insulating layer with a thickness of 300 nm or 3000 Angstroms (column 5, lines 2-3). Haven et al. (USPN 6,215,241 B1) discloses that a silicon dioxide film having a thickness between 500 and 5000 Angstroms is transparent (column 8, lines 20-25). Thus Dodabalapur meets the limitation of the claim.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dodabalapur et al. (USPN 5,596,208) in view of in view of Bao et al., ("Soluble processable regioregular poly(3-hexylthiophene) for thin film field-effect transistor applications with high mobility," Applied Physics Letters 69 (26), p.4108-4110, 1996) as applied to claim 17 above and further in view of Garnier et al. (USPN 5,347,144).

8. In reference to claim 18, Dodabalapur does not disclose the use of a polymeric media as the gate insulator. However the use of a polymeric media as a gate insulator is well known in the art. Garnier et al. (USPN 5,347,144, hereinafter referred to as the "Garnier" reference) discloses that polyvinyl alcohol (a polymeric media) is a desirable gate insulator since it has a sufficiently high dielectric constant that allows an improved quality of carriers (column 2, lines 43-58). In view of Garnier, it would therefore be obvious to use polyvinyl alcohol as the gate insulator in the device of Dodabalapur.

9. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dodabalapur et al. (USPN 5,596,208) in view of in view of Bao et al., ("Soluble

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processable regioregular poly(3-hexylthiophene) for thin film field-effect transistor applications with high mobility,” Applied Physics Letters 69 (26), p.4108-4110, 1996) as applied to claim 17 above and further in view of Aratani et al. (USPN 5,705,826).

10. In reference to claim 18, Dodabalapur does not disclose the use of a polymeric media as the gate insulator. However the use of a polymeric media as a gate insulator is well known in the art. Aratani et al. (USPN 5,705,826, hereinafter referred to as the “Aratani” reference) discloses that polymethyl methacrylate (a polymeric media) is a desirable gate insulator when used in conjunction with an organic semiconductor since the same process may be used to fabricate both the gate insulator and the organic semiconductor (column 8, lines 44-57). In view of Aratani, it would therefore be obvious to use polymethyl methacrylate as the gate insulator in the device of Dodabalapur.

Allowable Subject Matter

11. Claim 23 is allowed.

12. Claim 20 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter: the examiner is unaware of any prior art which suggests a method of fabricating a photosensing organic field effect transistor with the exact semiconducting polymer layer and its specific dopants as suggested by the applicant.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Quinto whose telephone number is (571) 272-1920. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KVQ



NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800